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Two - phase thermosyphon filled with R410A refrigerant operating at low evaporator temperature (Article)

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Abstract

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The thermal performances of a R410A filled thermosyphon subjected to low heat flux from 1882 W/m2 to 4423 W/m2 and evaporator wall temperatures between 20 °C and 50 °C with fill ratios 1.00 and 0.75 and at different inclinations from 45°, 68° and 90° were investigated. The axial temperature distribution of the thermosyphon was found to be uniform for all temperatures difference of evaporator at all power inputs. The performance of the thermosyphon which is determined from the heat transfer capability of the thermosyphon was found to be dependent of inclination angle and fill ratio. Experimental results show that heat transfer coefficient increases as the heat input increase while thermal resistance decreases exponentially with increasing input power. Increase in fill ratio and inclination angle at various heat input contributed to a better thermosyphon performance, at where heat transfer was highest at fill ratio 1.00 and inclination angle of 68°. In addition experimental and application measured readings have a percentage error less than 10 %. © 2019 Penerbit Akademia Baru.

Author keywords

- Dry-out limitation
- Filling ratio
- Heat transfer coefficient
- Inclination angle two phase thermosyphon
- Thermal resistance

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